ET-127 August 1938

United States Department of Agriculture
Bureau of Entomology and Plant Quarantine

AN INJECTOR FOR FORCING LIQUIDS INTO THE SOIL

By Charles B. Eaton, Division of Forest Insect Investigations

In treating soils with any liquid chemical that must be injected below the surface, a device to regulate automatically the quantity applied at each point of injection, for a given rate of treatment, should find ready use. An injector meeting this requirement has been developed by the writer in connection with investigations involving the use of liquid carbon disulphide for the control of white grubs in the seedbeds of forest nurseries.

This injector (fig. 1, A) is of all-metal construction. It consists of a reservoir made from an oil can, inside of which is placed a pump, somewhat similar in construction (fig. 1, B, C, D) to an ordinary air pump. When the reservoir is filled with the chemical and the plunger is in the position indicated, the liquid will run by gravity into the measuring chamber through intake holes in the pump barrel, and is kept from flowing out of the spout by means of a check valve (fig. 1, E) in the lower end of the pump barrel. The spring in this valve is strong enough to prevent leakage of the chemical under ordinary pressure, but not so strong as to prevent the ready passage of the liquid when the pump is in operation. When the plunger is pushed down, the chemical in the pump barrel above the intake holes flows back into the reservoir; but that in the measuring chamber, which is below the intake holes, is forced through the valve into the spout and out into the soil. When released, the plunger springs back to its original position, and the measuring chamber is automatically refilled.

The quantity of liquid ejected at each downward stroke of the plunger is dependent on the inside diameter of the pump barrel and the height of the intake holes above the lowest position to which the plunger can be pushed. The volume of the measuring chamber in the injector illustrated is 1.2 cc, the approximate amount of chemical to be applied in holes spaced 6 by 6 inches apart when treating at the rate of 1 pint per 100 square feet of soil surface. The amount applied cannot be changed except by using multiples of the dosage for which the instrument is built. For example, with the device in question a 2-pint treatment would be

obtained by making 2 injections per hole, using the spacing described above. Where compact soils are to be treated it is necessary to punch holes in the ground before inserting the injector, but in loose soils this step may be unnecessary. In either case, however, to obtain satisfactory results, the spacing of the holes must be rigidly adhered to.

This injector has been thoroughly tested under laboratory and field conditions (fig. 2) and has been found to be accurate, efficient, and practical for regulating the amount of liquid applied in soil injection work.

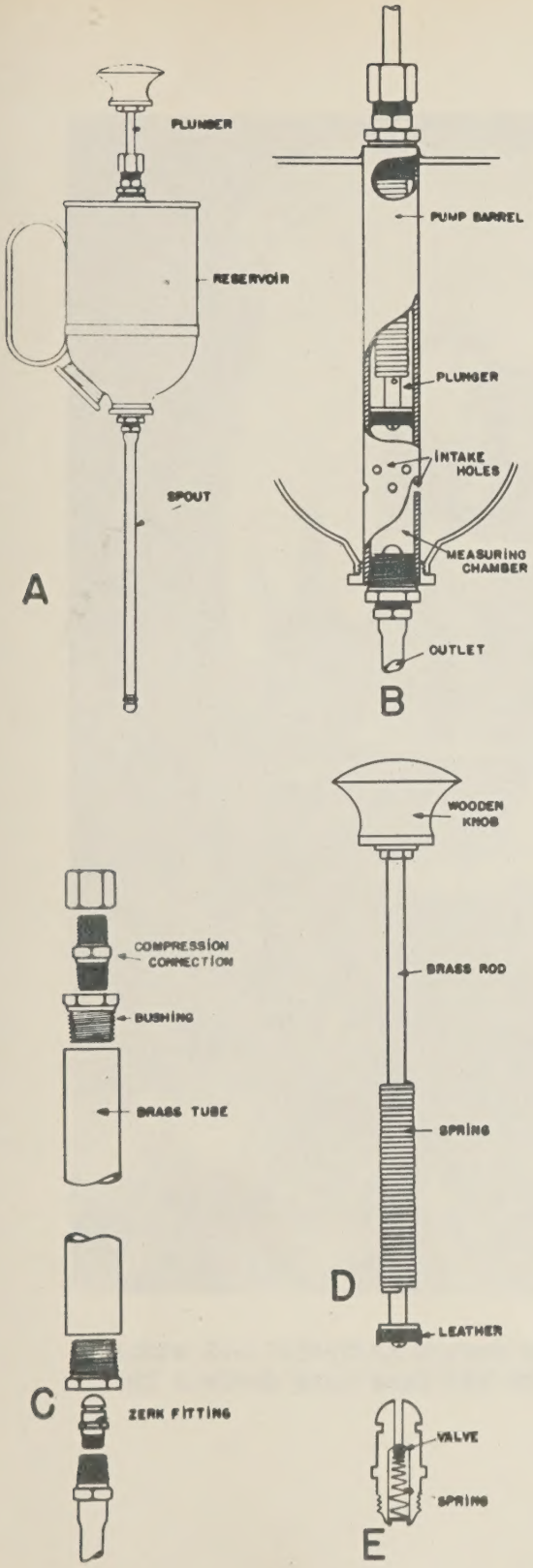

Figure 1.--Diagram of injector for forcing liquids into the soil: A, General view; B, details of pump; C, pump barrel assembly; D, plunger; E, check valve.


A
B
C
D
E

Figure 2.—Injecting carbon disulphide into the soil of a slash pine seed bed to control white grubs.